BASELINE VEGETATION ANALYSIS FOR A REMNANT BLACKLAND PRAIRIE IN WALKER COUNTY, TEXAS

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ABSTRACT

Baseline vegetation data on a remnant blackland prairie in Walker County, Texas was collected using permanent vegetation plots as a basis for monitoring future vegetation changes. This remnant prairie is privately owned and is part of working cattle and hay production ranch named Lone Oak Ranch. Historically, the prairie has been managed to preserve this rare and globally imperiled habitat.

KEYWORDS: Floristics, Walker County, Texas, vegetation

INTRODUCTION

Lone Oak Ranch includes one of the largest and most pristine and/or well recovered blackland prairies known in the Pineywoods of East Texas. The habitat concerned is defined as the Little Bluestem (*Schizachyrium scoparium*)-Indiangrass (*Sorghastrum nutans*) Community Series (Texas Natural Heritage Program 1993). This plant association can be more narrowly defined in eastern Texas as the Little Bluestem (*Schizachyrium scoparium*) – Missouri Coneflower (*Rudbeckia missouriensis*) – Narrowleaf Gumweed (*Grindelia lanceolata*) – Cusp Gayfeather (*Liatris mucronata*) Prairie or West Gulf Coastal Plain Fleming Calcareous Prairie (NatureServe 2005); it is ranked as a G1 community, meaning that it is considered "critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction with typically 5 or fewer occurrences or very few remaining

Species	#1	#2	#3
Berchemia scandens		2067	
Bumelia lanuginosa		300	467
Celtis laevigata		267	
Cornus drummondii		7267	
Crataegus crus-galli		733	
Crataegus spathulata		200	
Diospyros virginiana		200	
Forestiera ligustrina		2267	
Gleditsia triacanthos	67	133	
Ilex decidua		267	
Ilex vomitoria		133	
Juniperus virginiana	200	67	
Ligustrum sinense		133	
Lonicera japonica		200	
Pinus taeda		67	
Prunus angustifolia		67	
Quercus virginiana		267	
Rhamnus caroliniana		533	
Rubus trivialis	733	2933	533
Symphoricarpos orbiculatus		7733	733
Toxicodendron radicans		333	
Vitis aestivalis		67	
All species	1000	30400	1733

Table 1. Woody species recorded in each plot in stems/ha. Woody species were counted in a 30-m X 5-m plot.

individuals (<1,000) or acres (<2,000) or linear miles (<10)" (Nature Conservancy 2000, NatureServe 2005).

This plant association is naturally rare in the West Gulf Coastal Plain, occurring only sporadically where areas of Vertisol soils are present over the Fleming geologic formation (Nature Conservancy 2000, NatureServe 2005). Very few high-quality examples are known, and most existing examples have been heavily degraded by past land uses, and many more have been completely converted to other land uses (Nature Conservancy 2000, NatureServe 2005, personal

observation). Primary threats to this community include land development, fire suppression, livestock grazing, oil and gas exploration, soil harvesting, and impacts from road development and vehicle use. The historical fire frequency of this grassland is estimated to range from 5 to 20 years (NatureServe 2005). Woody species such as Eastern red cedar (*Juniperus virginiana*), gum bumelia (*Bumelia lanuginosa*), Alabama supplejack (*Berchemia scandens*), rough-leaf dogwood (*Cornus drummondii*), saw greenbrier (*Smilax bona-nox*), coral berry (*Symphiorcarpos orbiculatus*), southern dewberry (*Rubus trivialis*) and honey locust (*Gleditsia triacanthos*) invade this community and change the physiognomy as a result of fire suppression (NatureServe 2005, personal observation).

Lone Oak Prairie is composed of approximately 120 acres of remnant and/or restored blackland prairie. Historical ground disturbance such as farming and intensive grazing occurred throughout the property. However, these historically disturbed areas are now composed primarily of native herbaceous species typical for blackland prairies such Indiangrass, little bluestem, lovegrass (*Eragrostis intermedia*), meadow dropseed (*Sporobolus compositus*), and Florida paspalum (*Paspalum floridanum*). The most heavily disturbed portions of the prairie have a significant component of the invasive species, King Ranch (KR) bluestem (*Bothriochloa ischaemum*). However, the portion of the prairie located in the southeastern corner of the property appears to have avoided or successfully recovered from most of the historical ground disturbance and is in near pristine condition. In addition, KR bluestem is less prominent in this portion of the prairie.

Lone Oak Prairie is particularly susceptible to encroaching development. Interstate Highway 45 and heavily-traveled Highway 30 to Bryan-College Station intersect less than a mile to the east of the property. The resulting development (including gas stations, restaurants, hotels, and a Wal-Mart) is typical of the structures found at such major intersections. A newly constructed local roadway (parallel to I-45) and the associated structures (including office buildings and a shopping mall) are located less than ½ mile to the east between I-45 and the property and visible from the southeastern corner of the prairie.

A subdivision and other residences are located less than ½ mile to the west. Some of the residences to the west are also visible from the property. The surrounding forests are a matrix of pine-hardwood and bottomland hardwood forests with a dense shrub layer and sparse herbaceous understory.

MATERIALS AND METHODS

Plot establishment and measurement follow National Park Service protocol as outlined in the Western Region Fire Monitoring Handbook (1992) prepared by the Western Region Prescribed and Natural Fire Monitoring Task Force. Using this methodology, three brush plots were established in three different areas of the prairie. Each brush plot is a 30-meter transect line running in a north-south direction. Both ends of each transect were marked with rebar stakes and t-posts. To determine absolute cover of all species, all vegetation, contacting a 2-m tall rod placed perpendicular to the ground, was recorded every 30-cm along the 30-m transect for a total of 100 contacts. All woody species were recorded in a 30-m X 5-m plot along the transect. Herbaceous plant density was recorded using three 1-m x 1-m plots every ten meters along the transect. Plot 1 was established in a historically disturbed prairie where native herbaceous vegetation is becoming re-established. Plot 2 was established along the eastern edge of the prairie where woody species are beginning to encroach onto the grassland. Plot 3 was established in a near pristine portion of the prairie that is composed primarily of native herbaceous species. Nomenclature for species recorded in plots generally follows Diggs et al. (1999) and Turner et al. (2003). Vegetation was analyzed and quantitatively described following protocols outlined in the Fire Monitoring Handbook (NPS, 1992) and NPS National Fire Monitoring Handbook Software, Version 3.10.2.1 (Syndoriak, 1991).

RESULTS AND DISCUSSION

Data collected in this study provides baseline data in three portions of a remnant and/or recovering blackland prairie. This data will be used to monitor long term vegetation changes that occur from management activities such as prescribed burning, woody species

encroachment, climate changes, etc. Table 1 illustrates all woody species recorded; Table 2 illustrates absolute cover for all species recorded along the 30-m^2 transect; and Table 3 illustrates herbaceous species recorded in three 1-m^2 transects.

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Species (% Cover)	#1	#2	#3
Agalinis heterophylla			1.0
Ambrosia psilostachya	3.0	3.0	
Ambrosia trifida		2.0	
Amphiachyris dranunculoides	1.0	2.0	1.0
Andropogon glomeratus	5.0	7.0	7.0
Aristida longespica	1.0	2.0	1.0
Aristida oligantha	23.0	9.0	
Bothriochloa ischaemum			1.0
Bothriochloa laguroides	13.0	12.0	16.0
Bromus japonica		2.0	
Carex cherokeensis	9.0	2.0	5.0
Carex microdonta	3.0	2.0	1.0
Cornus drummondii		1.0	
Croton monathogynus	1.0	2.0	
Cuscuta indecora		5.0	2.0
Dalea multiflora	1.0	2.0	
Desmanthus illinoensis		3.0	
Dichanthelium scribnerianum	7.0	8.0	1.0
Eragrostis intermedia	5.0	6.0	
Euphorbia bicolor	11.0	7.0	
Grindelia lanceolata	10.0	2.0	2.0
Hedyotis nigricans		1.0	2.0
Indigofera miniata		1.0	
Iva annua	18.0	8.0	14.0
Liatris mucronata			1.0
Muhlenbergia capillaris		1.0	
Neptunia lutea	1.0		
Oenothera speciosa	1.0	1.0	
Oxalis stricta	1.0		
Paspalum floridanum		9.0	2.0
Paspalum setaceum	1.0		
Rubus trivialis		7.0	
Rudbeckia missouriensis	8.0	10.0	9.0

Salvia lyrata			1.0
Schizachyrium scoparium	5.0	30.0	51.0
Setaria parviflora	3.0	9.0	6.0
Solidago canadensis	2.0	1.0	4.0
Sorghastrum nutans	6.0	2.0	19.0
Sporobolus clandestinus	1.0	1.0	
Sporobolus compositus	26.0	17.0	24.0
Symphyotrichum ericoides	5.0		4.0
Symphoricarpos orbiculatus		7.0	
Verbena halei	1.0		
Verbena xutha	1.0		
Substrate	4.0	1.0	1.0

Appendix 1. All species recorded in cover transects in each plot according to absolute cover. Cover measurements were recorded every 0.3-m along a 30-m transect. Substrate includes leaf litter, duff, rocks, and bare soil.